Bison
Management Report
of survey-inventory activities
1 July 2007–30 June 2009

Patricia Harper, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation

Funded through
Federal Aid in Wildlife Restoration
Grants W-33-6 and W-33-7, Project 9.0
2010 Set

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Please note that population and harvest data in this report are estimates and may be refined at a later date.

Cover Photo: Delta bison can be seen gathered along the Delta River, near Black Rapids Glacier, during an aerial survey conducted by ADF&G to assess the size and composition of the population. The counts from aerial surveys help biologists determine the number of drawing permits that will be issued for the winter bison hunt.

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If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2010. Bison management report of survey-inventory activities 1 July 2007–30 June 2009. P. Harper, editor. Juneau, Alaska.

Please note that this report was released as a complete set in 2011, but is part of the 2010 set of species management reports. We encourage referencing this report as a 2010 report to maintain understanding of when reports were written and ease of locating this particular set of reports.

BISON MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

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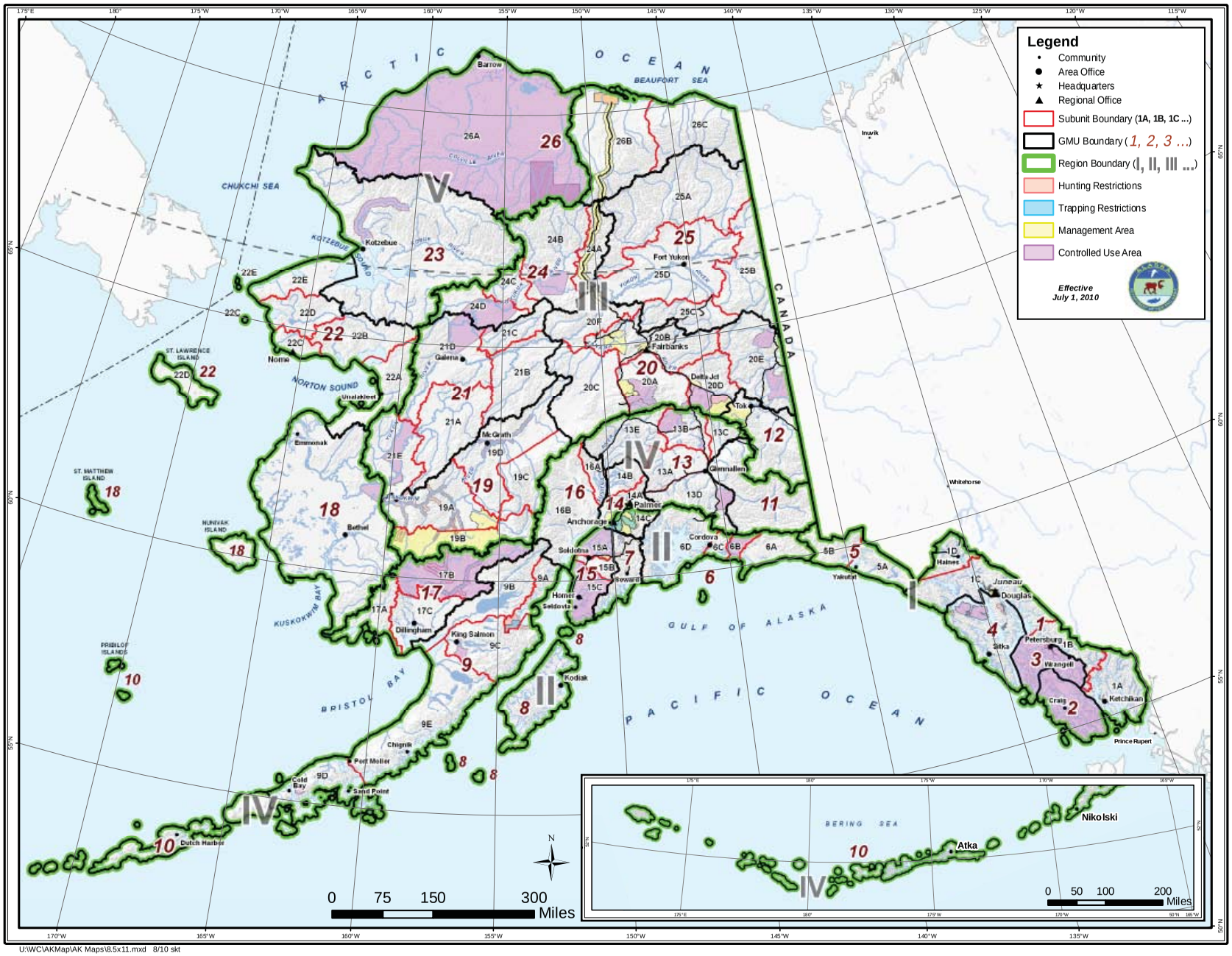

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MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
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BISON MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi^2)

HERD: Copper River Herd

GEOGRAPHIC DESCRIPTION: Klawasi River to the Kotsina River

BACKGROUND

The Copper River bison herd originated from animals relocated to Delta Junction, Alaska, from the National Bison Range in Moise, Montana, in 1928. In 1950, five bulls and 12 cows were moved from the Delta herd to the Nabesna Road in northern Game Management Unit (GMU) 11. These bison moved away from the release site, and by 1961 they had moved into the Dadina and Chetaslina Rivers, where they remained. Throughout the years, herd estimates have varied from a low of 51 bison in 1967 to a high of 143 in 2009. The most important known factors controlling herd size are snow depth and hunter harvest.

The department held the first hunt, by registration permit, for Copper River bison in 1964. Between 1964 and 1988, hunters harvested 217 bison from this herd. The hunt was closed in 1989 by emergency order because of a decline in herd size due to extremely deep snowpack. Hunting remained closed until 1999, when herd size and productivity increased enough to resume annual harvests. Harvests since 1999 have been under a drawing permit hunt.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain the herd at a minimum of 60 overwintering adults by controlling the number of bison taken by hunters.

METHODS

Aerial surveys were conducted to determine composition of the herd following the spring calving period. Between 1984 and 1992, radio collars were used to help locate the herd during spring surveys. Currently, there are no radio collars in this herd. Surveys are conducted in early June, when bison are most aggregated in open areas along the Copper or Dadina Rivers.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Following a period of growth in the 1950s, the Copper River bison herd was relatively stable during the late 1960s and 1970s. Numbers declined appreciably in the late 1980s and remained low until the mid 1990s. The herd started increasing after dropping to an estimated 64 animals in 1995. The 2009 count of 143 total bison is up 14% from the 2005 count of 125.

Population Composition

Aerial surveys showed 118 adults and 25 calves in 2009 (Table 1). Current calf production is high with the 2008 count of 32 calves the highest ever observed in this herd. Overall calf production has averaged 22 calves a year over the last 10 years (range = 32–14). The calf count is the highest observed to date and the 2009 count of 118 adults is up 10% from the 2005 count of 107 adult bison, which was the highest previous count ever observed in the Copper River herd. The number of adults in the herd has exceeded the overwintering minimum population objective of 60 adults since 1997.

Distribution and Movements

The Copper River bison herd inhabits a home range bounded by the Klawasi River on the north, the Copper River on the west, the Kotsina River to the south, and the Wrangell Mountains to the east. Bison or bison sign was seldom observed north of the Dadina River until recently and this range extension coincides with the increase in herd size. The herd's seasonal distribution includes intensive use of the floodplain and bluffs along the Copper River and sedge swamps back of the river during winter and spring. During summer, the bison move to higher elevations along the Dadina and Chetaslina rivers to feed on vegetation as it greens up later in the season. During the late 1970s and the 1980s, there were only occasional reports of bison along the western bank of the Copper River in Unit 13. We surmised that human disturbance in the Kenny Lake area and hunting pressure prevented range extension to the west. During the 1990s, however, bison were reported grazing in hay and crop fields in the Kenny Lake area. Bison in the Kenny Lake area have been almost entirely harvested under recent hunts which reduced animal damage to crops on the Kenny Lake farms.

MORTALITY

Harvest

Season and Bag Limit. The season for residents and nonresidents in Units 11 and 13D is 1 September–31 March. The hunt area includes that portion of GMU 11 east of the Copper River, south of the Klawasi River and Sanford Glacier, west of a line from Mount Sanford to Mount Wrangell to Long Glacier, and west of the Kotsina River and that portion of GMU 13D north of the Edgerton Highway. The bag limit is one bison every 10 regulatory years.

Board of Game Actions and Emergency Orders. During its spring 1999 meeting, the Board of Game opened the Copper River bison hunt for the first time in 10 years. The hunt was changed from a registration to a drawing permit hunt, and the hunt area was enlarged to include a portion

of GMU 13D. In spring 2009 the BOG extended the northern harvest border from the Nadina to the Klawasi River.

Hunter Harvest. Hunters took 4 bison (2 bulls, 2 cows) during the 2008 season and 11 bison (6 bulls, 5 cows) during the 2007 season (Table 2).

Permit Hunts. The Copper River bison hunt is administered through drawing permits (DI 454) with up to 24 permits allowed to be issued annually (Table 2). There were 24 permits issued per year between 2004 and 2007 but only 18 were issued in 2008 because of the decline in the annual count. Interest in this hunt has been relatively stable in recent years with 940 applications received in 2008. Permittees were required to indicate prior to 1 September if they would hunt. If not, an alternate was chosen. Permittees reported to the Glennallen office to pick up their permits and received detailed maps of the hunt area, including land ownership patterns. This gave us the opportunity to identify private property and emphasize the need to respect private property rights. Successful hunters reported to the Glennallen office within one day of leaving the field.

Hunter Residency and Success. Three local residents reported taking a bison in 2007 and one nonresident was successful in 2008. The majority of all successful permittees during this 2-year report period were nonlocal Alaska residents (Table 3). Historically, the hunt was popular with local residents, and during the 1988 registration hunt, 40% of the hunters were local residents. Changing from a registration to a drawing hunt reduced the level of local resident and nonresident participation. Only 3 nonresidents have hunted since 1999, 2 successfully.

Harvest Chronology. During 2008, hunters took 4 bison, one each in September, October, February and March (Table 4). During the last 10 seasons, September has been the most important harvest period, accounting for 29 (40%) reported kills, with March second at 21 kills (29%). The season provided approximately 210 days of hunting opportunity.

Transport Methods. Riverboats continue to be the most important method of transportation for successful hunters, followed by snowmachines and aircraft (Table 5). Snowmachines can only be used once the Copper River freezes. Aircraft are only used during years of low snow cover when some bison remain east of the Copper River in the flats near Dadina Lake.

Other Mortality. We monitored winter severity and the potential for winter starvation by recording snow depths at the Dadina Lake snow station. This station is near the bluffs along the Copper River where the herd winters. The last winter classified as severe was recorded in 1994, the year before the population bottomed out. Snowfall in 1996 was deep enough for the winter to be classified as moderate, but every winter since has been mild. Snow depth appears to be a critical factor in overwinter bison survival. In years with deep snow, bison mortality increases and calf production and survival declines. Mild winters undoubtedly have been a factor in the herd increase observed during the last few years.

Field observations of the Copper River herd suggest accidental death may be an important source of natural mortality to bison. Sources of accidental mortality include falling off steep bluffs that border the Copper River and drowning in the river. During winter, bison use the bluffs extensively for feeding. These slopes have predominantly clay soils, which hold moisture and

freeze. The frozen clay creates a steep slide with little, if any, secure footing for the bison. Drowning mortality is difficult to document because dead bison are swept downriver.

Wolves, black bears, and brown bears are relatively abundant on the Copper River bison range. These predators are certainly capable of killing bison, but we have not researched predation rates on Copper River bison.

HABITAT

Assessment

Habitat conditions have not been studied on the Copper River bison range. Most of the range is black spruce forest. Bison frequent swamps, sedge openings, grassy bluffs, and river bars of the Copper, Dadina, and Chetaslina rivers. Field observations of these preferred feeding locations, such as the Copper River bluffs, show evidence of heavy use and reduced forage production.

CONCLUSIONS AND RECOMMENDATIONS

The Copper River bison herd started increasing in 1996, reaching a 30-year high of 143 bison in 2009. Calf production and survival the last 5 years has been high, ranging 18–32 calves observed a year. The number of adult bison has exceeded the minimum management objective of 60 overwintering bison for the last 9 years, and at 118 in 2009 is the highest observed.

The Copper River bison hunt was opened in 1999 after being closed for 10 years, and was changed from registration to a drawing permit hunt. When the hunt was administered by registration permit, hunt conditions were poor due to a very small accessible hunt area and overcrowding during the short season. With heavy hunting pressure, the harvest quota was often reached in 1–3 days, and the possibility was great that the harvest quota would be exceeded before the season could be closed by emergency order. The Board of Game addressed overcrowding and overharvesting by changing the hunt to a drawing hunt when the season was opened in 1999. As a result, hunters receiving a drawing permit were assured a long season.

Access to the Copper River herd is limited to public lands along the Copper River and private farms along the Edgerton Highway. A large portion of the herd's range includes private property which opened to hunters in 2006 under a permit system where a fee is charged. Most of the bison are on this private land and permittee success is higher if an access permit is purchased. Farmers in the Kenny Lake area have also responded favorably to this hunt, because it reduces crop loss from bison.

Limiting factors on the size of the herd could include snow depth, hunter harvests, habitat, accidental deaths, and possibly predation. In years with good calf production and survival, hunter harvests have been sustainable and were used to control the herd growth when necessary. In years with deep snow, survival and production declined and hunter harvests were stopped. Accidental deaths from falls from the bluffs and drowning while crossing thin ice have been observed frequently enough to be considered an important cause of mortality. Wolves and bears are relatively abundant on the home range of the Copper River herd, but their impacts have not been researched. Predation by wolves and black bears probably focuses on calves, as adults are more aggressive and difficult to kill.

I recommend limiting future bison harvests to bulls only in an attempt to further increase the herd size. The herd has doubled since the mid 1990s even with a 10-year harvest of 72 bison, including 21 cows. The herd has extended its range north, using the sandbars and bluffs along the Copper River, and swamps and meadows, for feeding. Herd expansion has not been limited by predation. The advantage of letting the herd expand is that a higher, more stable harvest could occur. Current harvests have ranged from 5–10% of the herd.

PREPARED BY: **SUBMITTED BY:**

Robert W. Tobey — Wildlife Biologist

Gino Del Frate — Management Coordinator

Please cite any information taken from this section, and reference as:

Tobey, R.W. 2010. Unit 11 Copper River herd bison management report. Pages 1–8 *in* P. Harper, editor. Bison management report of survey and inventory activities 1 July 2007–30 June 2009. Alaska Department of Fish and Game. Project 9.0. Juneau, Alaska.

Table 1. Copper River bison spring aerial composition counts and estimated population size, 1999–2009.

Regulatory Year	Adults[a]	Calves	(%)	Bison Observed	Estimated Population Size[b]
1999–2000	68	19	(22)	87	87
2000–2001	73	14	(16)	87	87
2001–2002	89	19	(18)	108	108
2002–2003	86	22	(20)	108	108
2003–2004	88	22	(20)	110	110
2004–2005	99	26	(21)	125	125
2005–2006	107	18	(14)	125	125
2006–2007	No count				
2007–2008	92	18	(16)	110	110
2008–2009	103	32	(24)	135	135
2009–2010	118	25	(17)	143	143

[a] Fixed-wing aircraft survey – no composition other than adults and calves.
[b] Estimate reflects aerial count data.

Table 2. Copper River bison harvest data by permit hunt (DI454), 1999–2009.

Regulatory Year	Permits Issued	Applications	Percent Did not Hunt	Percent Unsuccessful Hunters	Percent Successful Hunters	Bulls	(%)	Cows	(%)	Unknown	Total Harvest
1999–2000	12	678	17	30	70	6	(86)	1	(14)	0	7
2000–2001	12	617	25	44	56	5	(100)	0	(0)	0	5
2001–2002	12	680	33	50	50	4	(100)	0	(0)	0	4
2002–2003	20	778	15	31	69	8	(73)	3	(27)	0	11
2003–2004	20	1073	30	50	50	4	(57)	3	(43)	0	7
2004–2005	24	1283	25	47	53	6	(75)	2	(25)	0	8
2005–2006	24	1304	25	78	22	2	(50)	2	(50)	0	4
2006–2007	24	1058	13	45	55	8	(73)	3	(27)	0	11
2007–2008	24	1021	25	39	61	6	(55)	5	(45)	0	11
2008–2009	18	940	39	64	36	2	(50)	2	(50)	0	4

Table 3. Copper River bison hunter residency and success, 1999–2009.

Regulatory Year	Successful					Unsuccessful				Total hunters
	Local[a] Resident	Nonlocal Resident	Nonresident	Total	(%)	Resident	Nonresident	Total	(%)	
1999–2000	0	7	0	7	(70)	3	0	3	(30)	10
2000–2001	1	4	0	5	(55)	4	0	4	(45)	9
2001–2002	1	3	0	4	(50)	4	0	4	(50)	8
2002–2003	0	10	1	11	(65)	6	0	6	(35)	17
2003–2004	0	7	0	7	(50)	7	0	7	(50)	14
2004–2005	0	8	0	8	(53)	7	0	7	(47)	15
2005–2006	0	3	1	4	(22)	14	0	14	(78)	18
2006–2007	3	8	0	11	(58)	8	0	8	(42)	19
2007-2008	3	8	0	11	(61)	6	1	7	(39)	18
2008-2009	1	3	0	4	(36)	7	0	7	(64)	11

[a]Local means resident of Unit 11 or 13.

Table 4. Copper River bison harvest chronology, 1999–2009.

Regulatory Year	Harvest Period							
	Sept	Oct	Nov	Dec	Jan	Feb	Mar	*n*
1999–2000	2	3	0	0	0	0	2	7
2000–2001	2	2	0	0	0	1	0	5
2001–2002	2	0	0	0	0	0	2	4
2002–2003	6	1	0	0	1	0	3	11
2003–2004	3	1	0	0	0	1	2	7
2004–2005	4	2	0	0	0	1	1	8
2005–2006	1	2	0	0	0	1	1	4
2006–2007	6	0	1	0	0	1	3	11
2007-2008	2	3	0	0	0	0	6	11
2008-2009	1	1	0	0	0	1	1	4

Table 5. Copper River bison harvest percent by transport method, 1999–2009[a].

Regulatory year	Percent (%) of harvest								
	Airplane	Horse	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unknown	*n*
1999–2000	14	0	14	14	14	0	43	0	7
2000–2001	0	0	40	20	20	0	20	0	5
2001–2002	25	0	25	0	50	0	0	0	4
2002–2003	9	0	64	0	27	0	0	0	11
2003–2004	14	0	43	0	43	0	0	0	7
2004–2005	13	0	63	0	25	0	0	0	8
2005–2006	0	0	75	0	25	0	0	0	4
2006–2007	0	0	55	0	45	0	0	0	11
2007-2008	45	0	45	9	0	0	0	0	11
2008-2009	25	0	50	0	25	0	0	0	4

[a] Due to rounding, total percentages may not equal 100%.

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Division of Wildlife Conservation
907-465-4190 PO BOX 115526
JUNEAU, AK 99811-5526

BISON MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi^2)

HERD: Chitina River herd

GEOGRAPHIC DESCRIPTION: The Chitina River from the confluence of the Tana River and Chitina Glacier

BACKGROUND

The Chitina bison herd originated from animals relocated to Delta Junction, Alaska, from the National Bison Range in Moiese, Montana, in 1928. In 1962, 29 cows and 6 bulls were moved from Delta Junction to May Creek. The herd increased to as many as 56 bison in 1985, then declined to a low of 25 in 2004 because of increased overwinter mortality in years with deep snowpack.

The first Chitina bison hunt was held by drawing permit in September of 1976. Permit hunts were held for 13 years, during which hunters took 58 bison, an average yearly harvest of 4 animals. The hunt was closed in 1989 because of a decline in herd size. Hunting resumed in 1999 with drawing permits for bulls only and has remained open except for 2004 and 2005, when the season was closed due to a decline in the herd.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Maintain the herd at a minimum of 50 overwintering adults by increasing or decreasing human harvests when bison numbers exceed or fail to reach the objective.

METHODS

Aerial surveys to determine composition of the herd are conducted in June each year, after the calving period. Survey techniques included flying transects throughout all bison habitat within the Chitina Valley to obtain a direct count.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The Chitina bison herd was relatively stable for about 12 years between 1976 and 1987; the average herd size was 48. Starting in 1988, the herd declined, and, except for a slight increase in 1996 and 1997, averaged between 30 and 35 bison until 1999. The Chitina herd increased for the next four years, peaking at 50 animals in 2003. A large die-off occurred during the spring of 2004 due to deep snow conditions, and only 25 bison were observed that summer. The herd has been increasing slowly since then with 41 bison counted in 2009 (Table 1).

Population Composition

For consistency, surveys are flown in June each year. In 2009, 36 adults and 5 calves were observed during an aerial survey of the Chitina herd. Calf numbers were 7 in 2008 and 5 in 2009 (Table 1).

Distribution and Movements

The Chitina bison herd ranges throughout the riparian and upland habitat below 2,000 ft elevation along a 40-mile portion of the upper Chitina Valley. Although movements vary considerably, the traditional range of the herd has been between the Tana River and Barnard Glacier. During the 1990s, biologists observed especially heavy use of the riparian zone between Bryson Bar and Bear Island on the north side of the Chitina River. Changes in the flow of the Chitina River during the last 20 years caused considerable erosion of bars and banks on the north side of the river. During the last 5 or 6 years, bison use on the south side of the river has increased as bison seek new feeding areas to replace those lost to erosion.

In the summer of 2009, a large wildlife fire occurred just west of the bison range, in the Chakina drainage south of the Chitina River. Early successional regrowth may attract bison in coming years.

MORTALITY

Harvest

Season and Bag Limit. The hunting season for residents and nonresidents in Unit 11 is 6 September–30 November. The bag limit is 1 bull every 10 regulatory years by drawing permit. The hunt area is that portion of the Chitina River east of the Chakina River and south and east of the Nizina River in Unit 11.

Board of Game Actions and Emergency Orders. In 1999 the Board of Game opened the Chitina bison hunt after a 10-year closure. The 2004–05 and 2005–06 seasons were closed by emergency order (EO) after the severe winter of 2003–04 resulted in increased overwinter mortality and low subsequent calf production and/or survival.

Hunter Harvest. Hunters killed 2 bulls during both the 2007 and 2008 seasons (Table 2). A total of 13 bulls have been harvested since the season reopened in 1999.

Permit Hunts. Chitina bison are hunted under a drawing permit hunt (DI 450); up to 2 permits are authorized annually. For the 2009–2010 season, 534 hunters applied for the available permits.

Hunter Residency and Success. The hunter success rate was 100% for this reporting period (Table 3). One permittee was a local Alaska resident, 2 were nonlocal Alaska residents, and 1 was a nonresident (Table 4). This was the first nonresident Chitina bison hunter in over 25 years. The number of days hunted in order to take a bison has been highly variable, with successful hunts lasting between 1–6 days.

Transportation Methods. Most successful hunters report the use of aircraft, however one hunter in 2007 reported the use of a boat (Table 5).

Predation. Trappers and local residents have reported wolf predation on bison. Brown bears also have been observed feeding on bison carcasses, but it is not known if they killed the bison or were scavenging. Research on wolf or brown bear predation on Chitina River bison has not been conducted because of the high costs of such a study and the remote nature of this herd. Given the consistent herd size and small range of these bison, it is not likely that predation has much effect on this herd.

Other Mortality. Deep snow over a prolonged period during the winter is an important cause of mortality and reduced productivity in the Chitina bison herd. Deep snows were considered important factors in the herd decline in the late 1980s and poor recruitment during the 1990s. Deep snow was also recorded for the Upper Chitina Valley in 1997–98, which resulted in a similar decline in both population size and productivity. In the spring of 1998, 6 adult bison were found dead; the deaths were attributed to starvation because all the examined bison were emaciated and had low bone marrow fat, and there was no sign of predation. The Chitina bison herd was subjected to another severe winter in 2003–04, and field necropsies on 3 dead bison again resulted in a diagnosis of starvation.

Poaching was documented on the Chitina bison herd during the 1980s. Because of the remoteness of this herd, apprehending poachers is difficult. The extent or impact of poaching on this herd is unknown.

HABITAT ASSESSMENT

In 1984 the National Park Service studied the range in the upper Chitina Valley (Miquele 1985). This study indicated grazing by ungulates on the Chitina bison range had not caused recent plant deterioration. The range was recovering from earlier overuse, when horses were abundant on grazing leases. Miquele (1985) also found that a bison herd of 50 animals had not damaged the habitat, and the management objective of 30 overwintering bison could be increased; however, he concluded the range could not support a very large bison herd.

Appreciable vegetation loss occurred on the Chitina bison range during the early 1990s. This is a result of re-channelization of the Chitina River toward the north bank. The first area affected was the floodplain northeast of Bear Island. This was a heavily used riparian area before 1991, when flooding first occurred and more than 50% of the vegetation washed away. Since 1991, flooding has occurred east of Bear Island, near Bryson Bar, and has extended upriver toward Hubert's Landing. Recent bison mortality during two winters with deep snow suggests this loss of critical

river bar habitat may have reduced the carrying capacity until vegetation can be reestablished on the newly exposed bars. Habitat on the south side of the river is improving as vegetation is growing on bars that have dried out over the last 10 years.

The 2009 Chakina Fire burned more than 52,000 acres just west of the current bison range south of the Chitina River. This fire will likely provide additional range for the bison in coming years. While early successional deciduous vegetation may take some time to develop, beneficial sedges, grasses, and forbs may be available to bison as early as 2010.

CONCLUSIONS AND RECOMMENDATIONS

The Chitina bison herd increased between 1999 and 2003, peaking at 50 bison. The 2003 count of 50 animals was the highest count in 18 years, since 56 bison were seen in 1985. The winter of 2003–04 saw a prolonged and deep snowpack in the upper Chitina River valley. Observed mortality in the Chitina bison herd increased, and field necropsies determined the cause of death to be starvation. The herd estimate the following year, in 2004, was only 25 bison of which only 2 were calves. Since 2005, the herd has slowly increased. The current herd estimate of 41 still falls below the 50 bison minimum objective.

Population estimates in the Chitina herd are based on a single yearly survey of all known bison habitat. Because bison can be missed during a survey, some fluctuations in count data between years probably reflect survey technique rather than actual changes in bison numbers. Solitary bulls are especially difficult to find on aerial surveys.

Severe winters with prolonged, deep snows and lack of sufficient wind to clear river bars of snow are considered the most important limiting factors on the Chitina bison herd. Flooding of critical river bars and loss of vegetation cover has reduced traditional foraging areas and forced bison onto more marginal habitats. This loss of available foraging areas exacerbates the effect of deep snow conditions on foraging behavior of the Chitina bison herd. Some of the negative effects of bank and bar erosion may be temporary, because new bars were created and plant colonization should eventually provide additional foraging areas. Bison should benefit from the recent Chakina wildlife fire, although their response in coming years will indicate just how useful the fire has been.

Incidental mortality during deep snow winters presents another management problem. The effect of deep snow on survival is probably density independent, because increased mortality and a decline in productivity have been observed at various stocking levels. Examination of winter-killed bison indicates very old bison are especially susceptible. Calves of the year also probably have high mortality rates, but they are not found because they die earlier in the winter and are more easily scavenged. The magnitude of a die-off in a deep snow year will depend on the calf production and number of aged bison in the population.

After the herd declined, hunts were closed by emergency order in 2004 and 2005. Hunting was resumed in 2006 and 2 bison have been taken each year since then. Future management should focus on meeting the herd objective and reducing the effect of severe winters by lowering the number of susceptible old bison present in the herd. To accomplish this, a limited harvest of adult bulls was instituted in 1999. Management efforts will focus on harvesting a limited number of adults each year, depending on herd size, thus reducing the number of animals in the “aged”

class that are susceptible to winter mortality. Because winter mortality appears to be somewhat density independent, limited bull harvests should be allowed if the herd exceeds 30 bison but is below the objective of 50 animals. Cow harvests should be instituted when the herd approaches 40 overwintering animals and when 4 or more calves are recruited. While this limited harvest will not prevent winter mortality, it will provide some human use of the Chitina bison herd even when numbers fall below the 50-bison objective. To date, all harvested bison have been old, trophy bulls; thus current harvest strategies are meeting management objectives. Conducting a very small drawing permit hunt for bison is justified because of the popularity of all hunts on wild bison.

I recommend issuing 2 either-sex permits annually if overwintering survival remains at the current level.

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PREPARED BY: **SUBMITTED BY:**

Robert W. Tobey — Wildlife Biologist

Gino Del Frate — Management Coordinator

Please cite any information taken from this section, and reference as:

Tobey, R.W. 2010. Unit 11 Chitina River herd bison management report. Pages 9–16 *in* P. Harper, editor. Bison management report of survey and inventory activities 1 July 2007–30 June 2009. Alaska Department of Fish and Game. Project 9.0. Juneau, Alaska.

Table 1. Chitina bison spring aerial composition counts and estimated population size, 2001–2009.

Regulatory year	Adults[a]	Calves	(%)	Bison observed	Estimated population Size[b]
2001–2002	32	6	(16)	38	38
2002–2003	32	7	(18)	39	39
2003–2004	41	9	(18)	50	50
2004–2005	23	2	(08)	25	25
2005–2006	31	4	(11)	35	35
2006–2007	29	4	(12)	33	33
2007–2008	32	4	(11)	36	36
2008–2009	32	7	(18)	39	39
2009–2010	36	5	(12)	41	41

[a] Fixed-wing aircraft survey – no composition other than adults and calves.
[b] Estimate reflects aerial count data.

Table 2. Chitina bison harvest and accidental death, 2001–2009.

	Hunter Harvest										
	Reported						Estimated				
Regulatory year	M	(%)	F	(%)	Unk.	Total	Unreported	Illegal	Total	Accidental death	Total
2001–2002	1	(100)	0	0	0	1	0	0	0	0	1
2002–2003	2	(100)	0	0	0	2	0	0	0	0	2
2003–2004	1	(100)	0	0	0	1	0	0	0	0	1
2004–2005	No Hunt										
2005–2006	No Hunt										
2006–2007	2	(100)	0	0	0	2	0	0	0	0	2
2007–2008	2	(100)	0	0	0	2	0	0	0	0	2
2008–2009	2	(100)	0	0	0	2	0	0	0	0	2

Table 3. Chitina bison harvest data by permit hunt (DI450), 2001–2009.

Regulatory year	Permits issued	Applications	Percent did not hunt	Percent unsuccessful Hunters	Percent successful hunters	Bulls	(%)	Cows	Harvest
2001–2002	2	307	0	50	50	1	(100)	0	1
2002–2003	2	241	0	0	100	2	(100)	0	2
2003–2004	2	302	0	50	50	1	(100)	0	1
2004–2005	No hunt								
2005–2006	No hunt								
2006–2007	2	431	0	0	100	2	(100)	0	2
2007–2008	2	302*	0	0	100	2	(100)	0	2
2008–2009	2	534	0	0	100	2	(100)	0	2

* In 2007-2008, only one permit was issued through the drawing application process; one permit was offered as a Governor's tag at the Wild Sheep Convention.

Table 4. Chitina bison hunter residency and success, 2001–2009.

	Successful					Unsuccessful					
Regulatory year	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Hunters
2001–2002	0	1	0	1	(50)	0	1	0	1	(50)	2
2002–2003	0	2	0	2	(100)	0	0	0	0	(0)	2
2003–2004	0	1	0	1	(50)	0	1	0	1	(50)	2
2004–2005	No hunt										
2005–2006	No hunt										
2006–2007	0	2	0	2	(100)	0	0	0	0	(0)	2
2007–2008	1	1	0	2	(100)	0	0	0	0	(0)	2
2008–2009	0	1	1	2	(100)	0	0	0	0	(0)	2

[a] Local means Unit 11 or 13 resident.

Table 5. Chitina bison harvest percent by transport method, 2001–2009.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	*n*
2001–2002	100	--	--	--	--	--	--	--	2
2002–2003	100	--	--	--	--	--	--	--	2
2003–2004	100	--	--	--	--	--	--	--	2
2004–2005	No Hunt								
2005–2006	No Hunt								
2006–2007	100	--	--	--	--	--	--	--	2
2007–2008	50	--	50	--	--	--	--	--	2
2008–2009	100	--	--	--	--	--	--	--	2

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO Box 115526
Juneau, AK 99811-5526

BISON MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009[1]

LOCATION

GAME MANAGEMENT UNIT: 19 **(**36,486 mi^2**)**

HERD: Farewell

GEOGRAPHIC DESCRIPTION: All of the drainages into the Kuskokwim River upstream from Lower Kalskag. Bison inhabit only the Farewell area in Units 19C and 19D

BACKGROUND

The Farewell bison herd was established in 1965 by translocating 18 bison from the Delta bison herd. The Alaska Department of Fish and Game (ADF&G, the department) translocated an additional 20 bison from Delta in 1968 to supplement the herd. The original stock was transported to Delta Junction in 1928 from the National Bison Range in Montana. During 1968–1999, the Farewell herd flourished, reaching a population size of approximately 350 animals. The herd has since declined, and surveys during the reporting period indicate the population numbered 149–217 animals. The first hunt for Farewell bison was held in 1972. The number of drawing permits issued annually ranged from 40–80 during 1972–2005, but was reduced to 20 in 2006 and 10 in 2007–2009 due to declining herd size. Approximately 1400 drawing permit applications were received for regulatory year (RY) 2009 (RY09 = 1 Jul 2009 through 30 Jun 2010) for the combined fall and spring hunts, indicating there continues to be strong hunter interest in this hunt.

MANAGEMENT DIRECTION

The Farewell bison harvest is managed for optimal sustained yield of animals based on herd size and trend, while providing uncrowded and aesthetic hunting conditions.

MANAGEMENT GOALS

GOAL 1: Maintain a population of sufficient size to reduce the genetic risks associated with small populations.

[1] At the discretion of the reporting biologist, this unit report contains data collected outside the report period.

GOAL 2: Maintain a sustainable harvest.

GOAL 3: Maintain and enhance bison habitat in cooperation with other land management agencies.

MANAGEMENT OBJECTIVES AND ACTIVITIES

- OBJECTIVE 1: Maintain a population of at least 300 bison.

Activities

  - Deploy and maintain enough radio collars on bison to monitor the herd distribution, movements, and population size.
  - Conduct aerial surveys of bison to assess herd distribution, population status and herd composition.

- OBJECTIVE 2: Maintain a harvest of up to 40 bison.

Activity

  - Issue up to 40 drawing permits, distributed during fall and/or spring hunts.
  - Adjust the number of drawing permits and sex ratio of the harvest using discretionary permit authority to achieve a harvest lower than recruitment until the population objective is achieved.

- OBJECTIVE 3: Maintain at least 50% of the bison winter range in sedge/grasslands and shrubs.

Activity

  - Conduct a controlled burn in cooperation with other agencies to reset bison habitat to an early successional stage every 5 to 10 years.
  - Assessment of habitat will be made during aerial surveys.

METHODS

We conducted aerial surveys April–August in 2007–2009 to estimate herd size and composition. Surveys were flown using fixed-wing aircraft and we used both visual search and radiotelemetry to locate groups of bison. We obtained a minimum herd size by surveying all known bison habitat in the vicinity of Farewell Station and along the South Fork Kuskokwim River and counting all bison observed. We classified bison as adults or calves.

To assist in locating groups of bison, 16 cows and 4 bulls were radiocollared in April 2008 using helicopter-supported darting techniques. Bison were immobilized using a Cap-Chur™ rifle and darts loaded with 5.1 mg carfentanil citrate (Wildnil®, Wildlife Pharmaceuticals, Fort Collins, CO, USA) and 60 mg xylazine hydrochloride (Anased®, Lloyd Laboratories, Shenandoah, IA, USA). Blood, feces and hair samples were collected for pregnancy, disease and genetic testing.

These radio collars supplemented the 8 radio collars deployed in October 2003. Additional collars are scheduled to be deployed in 2011.

Permit hunt reports included harvest date, location, chronology, transportation type, and effort. Harvest data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Estimated annual herd growth between 1968 (when aerial surveys were initiated) and 1988 was about 10%. Herd size began to decline in 2001 (Table 1) possibly due to hunting, predation, weather, and habitat senescence. We reduced the number of permits from 40 in RY05 to 20 in RY06 and 10 in RY07 and RY08 due to concern over the low number of bison observed in recent surveys.

Recent genetics studies found that the Farewell bison herd may be important for bison conservation in North America. The Farewell bison genome appears to be free of domestic cattle gene introgression, which is rare in bison herds in North America (Halbert and Derr 2007). Additional genetic samples were collected during the 2008 captures, as well as from hunters, to further investigate this issue.

Population Size

The most bison counted in a survey since 2000 was 265 on 30 May 2000. At that time, and as late as 2003, the Farewell bison herd was still thought to contain 350 bison (Table 1). Repeated attempts to accurately determine herd size prior to 2008 were not successful because of unpredictable movements and the small number of radiocollared bison. In April 2008, 20 additional bison were captured. Using those bison and the 7 bison radiocollared in 2003, we located 217 bison in August 2008. Since that time the 2003 radio collars stopped transmitting and 4 of the new animals radiocollared in 2008 died (1 hunter and 3 unknown cause).

Population Composition

We conducted calving surveys in June 2008 and 2009 and found that calves composed 18% and 15% of the population in those years. Blood tests from bison captured in 2008 showed 7 of the 16 females (44%) were pregnant. This is likely biased low because we specifically targeted younger females. Five of the 6 adult females captured were pregnant (83%). We also captured one 2 year old, three 3 year olds and six 4 year olds. Of those younger animals, only two of the six 4 year olds were pregnant.

Distribution and Movements

During winter the herd was typically scattered in small groups (10–40 animals) on the Bear Creek burn and surrounding habitats, taking advantage of windswept grass and sedge forage. However, this burn is now over 30 years old and has senesced in terms of habitat quality for bison. Small groups of bison now also use a large burn caused by lightning in 1991 on the east side of the South Fork Kuskokwim River. A burn that occurred in 2009 along the Dillinger River may provide additional habitat in future years. The Farewell herd also uses the South Fork Kuskokwim River floodplain, as well as mountainous areas to the south near the headwaters of

the Kuskokwim River. Bison have been seen as far upriver as Sled Pass (Hartman River and Stony River headwaters) and into Ptarmigan Valley (South Fork Kuskokwim River and Happy River headwaters). Bison also were reported as far west as the Windy Fork and north to within 12 miles of Nikolai on the South Fork Kuskokwim River. Recent surveys have not detected any range expansion.

MORTALITY

Harvest

Seasons and Bag Limits.

Unit and Bag limit	Resident seasons	Nonresident seasons
UNIT 19		
1 bison every 5 regulatory years by drawing permit only.	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)	1 Sep–30 Sep (DI351) or 1 Mar–31 Mar (DI352)

Alaska Board of Game Actions and Emergency Orders. No Board of Game actions or emergency orders were taken or issued during RY07–RY08. However, the department used its permit authority and reduced the number of permits available to 5 in the fall and 5 in spring in both years. At the March 2008 meeting, the board passed a proposal that will put a new limit on all bison permits statewide, effective in RY09. This regulation will restrict residents to 1 bison permit every 10 years and to 1 permit per lifetime for nonresidents.

Hunt History. The first legal harvest from the Farewell herd occurred in RY72 after aerial surveys revealed that it could sustain small harvests. Since then hunts have been held every year except RY73. The Farewell bison hunt was generally administered as a drawing permit hunt, although in RY79 it was a registration hunt and in RY84 it was a Tier II subsistence hunt. During RY80–RY83, 20 permits were allocated each year, and during RY85–RY88, 40 permits were issued annually. The first spring bison hunt was held in March 1990 (RY89). During RY89–RY90, 70 drawing permits were awarded annually, 40 for fall (September) hunts and 30 for spring (March) hunts. In RY91, 80 permits were awarded (40 fall, 40 spring). In RY92–RY94, 50 permits were awarded (30 fall, 20 spring), and in RY95–RY99, 40 permits were issued (20 fall, 20 spring). In RY99, hunt conditions that confined hunters to a 10- or 15-day period during the season were changed to allow permittees to hunt any time during the fall or spring seasons. There were no changes in the seasons or bag limits during RY99–RY06, except that in RY06 only 20 permits were issued (10 fall, 10 spring) and during RY07 and RY08 only 10 permits were issued each year (5 fall, 5 spring).

Harvest by Hunters. The annual harvest of bison was 7–28 during RY04–RY08 (Table 2). Harvest was low because few permits were issued (range = 5–30) each year. The proportion of bulls harvested during RY04–RY08 was 25–100% (Table 2). Hunters prefer to take bulls because they are larger and have both more meat and trophy potential. In fall hunts (DI351), 67–100% of all bison taken were bulls. However, misidentification and low numbers of bison sighted per hunter can result in substantial female harvest. During the spring hunt (DI352) harvest of females was greater than males in 2 of the last 5 years and averaged 50% (Table 2), which may have contributed to the reduced bison population.

Governor's Permits. The first Governor's Permit was issued in 1998. The sportsman's group awarded the permit kept 10% of the proceeds, and returned the remainder of the money to the department. Permits were sold to the highest bidder and went for $8100 in RY98 permit, $7500 in RY99, $5500 in RY01, $3500 in RY03, $1300 in RY04, and $2500 in RY06. We stopped offering the Governor's permit in RY07 and will not issue these permits again until the herd can sustain higher levels of harvest.

Harvest Chronology. Harvest chronology prior to RY99 was managed by limiting hunting by fall and spring permittees to different parts of the fall or spring seasons. However, beginning in RY99 permittees were allowed to choose when to hunt during each season. In general, there is no peak harvest period during either season (Table 3).

Hunter Residency and Success. Historically, and during RY04–RY08, the vast majority of applicants and permittees for the Farewell bison hunts were Alaska residents (Table 4). Of the permit winners who hunted during RY04–RY08, 9 were nonresidents, 4 were local residents (permittees who resided in Unit 19) and 78 were nonlocal residents (Table 4).

The average success rate for the September hunt (DI351) during RY04–RY08 was 72% (Table 2). Hunter success rate in the March hunt (DI352) during RY04–RY08 averaged 88% (Table 2). The higher hunter success rate in March is likely due to better access using snowmachines and ski-equipped airplanes. Overall, 20% of all permit winners did not hunt during RY04–RY08 and a mean of 80% of permit winners who hunted were successful (Table 2).

Transport Methods. This hunt is in a remote area that is difficult to access, and during RY04–RY08 most hunters used airplanes, with a smaller number using snowmachines (Table 5).

Natural Mortality

Wolf and grizzly bear predation on the Farewell herd was first documented in the early 1990s, more than 20 years after bison introduction. Since 1995 we have found some evidence of possible wolf and bear predation, but it does not appear to be a significant source of mortality.

HABITAT

The herd generally ranged over the 1977 Bear Creek burn (also known as the Farewell Burn) until the mid 2000s; however, as this burn has senesced bison have focused use along the South Fork Kuskokwim River and Farwell Station area. Summer range was investigated by Waggoner and Hinkes (1986) and bison were found primarily along the rivers and floodplains within the Alaska Range. The summer diet was 94% willow (*Salix* species), and the fall diet was 60% willow and 40% silverberry (*Elaeagnus commutata*) and buffalo-berry (*Shepherdia canadensis*). While summer habitat tends to be iced over in winter, Waggoner and Hinkes (1986) believed that, in general, summer habitat was not limiting. Campbell and Hinkes (1983) investigated winter diets and habitat use after the Bear Creek burn in 1977 and found sedges to be an important component of the winter diet. The post fire habitat was rich in this type of forage, and open sedge/grasslands hold less snow and encourage bison movements. The 1977 burn expanded available winter habitat considerably, and Campbell and Hinkes (1983) estimated the pre-burn carrying capacity of the area to be approximately 100 animals. Upland sedge/grassland habitats such as the Bear Creek burn require a frequent fire regime of approximately every 10 years and

the Farewell burn is now 31 years old. The senescing of this burn has likely had a large impact on bison numbers and distribution. In addition, Campbell and Hinkes (1983) pointed out the importance of contiguous winter and summer habitats across which bison can easily move and this has likely changed due to habitat conversion in the Farewell burn.

Although no current estimate of carrying capacity is available, a cursory examination of selected areas in summer 1995 by University of Alaska graduate student Maria Berger (M. Berger, University of Alaska Fairbanks, Alaska Cooperative Fisheries and Wildlife Resources Unit, 1995 unpublished report, Fairbanks), and an additional aerial evaluation by Robert Stephenson (ADF&G, unpublished report, Fairbanks) in spring 1998, indicated adequate summer forage availability, with unused range to the north, east, and west. At this point winter habitat may be a factor limiting this population (M. Berger, 1995 unpublished report).

In an effort to improve winter forage availability, The Alaska Department of Natural Resources Division of Forestry and ADF&G planned a spring burn in a portion of the 1977 Bear Creek burn where grass and sedge habitat is being replaced by black spruce. This was intended to increase forage for bison as well as moose. The prescribed fire was attempted in spring 2000 but the burn failed because conditions were too wet. Much was learned from this effort and we are reviewing the option of conducting another burn.

CONCLUSIONS AND RECOMMENDATIONS

We believe the Farewell bison herd has declined from an estimated high of 350 bison in the late 1990s to approximately 225. Based on recent surveys we did not meet the objective of maintaining a minimum population of 300 bison. Likely factors contributing to this decline include 1) harvest of cows (especially in the spring), 2) declining habitat quality, 3) reduced genetic diversity and 4) predation. We are currently monitoring 16 radiocollared animals and plan to deploy additional radio collars in April 2011. This will help us maintain a sufficient sample to monitor herd distribution and population size.

We met our objective to maintain a harvest of ≤40 bison during RY07–RY08. At the current population size it is prudent to continue with 10 permits per year. If additional declines are documented or the population fails to grow it may become necessary to restrict the hunt to bulls only. It is unclear if our third objective, to maintain at least 50% of the bison winter range in sedge/grasslands and shrubs, was met. There has not been a successful controlled burn in the Farewell area; however in 2009 lightning started the approximately 24,000 acre Dillinger River burn. How this will influence habitat and bison movements is unclear at this time, but preliminary assessments made by BLM suggest that the intensity of the burn was less than ideal for habitat enhancement.

We recommend continued herd monitoring during the next report period, as well as deployment of additional radio collars. We will continue to evaluate the effects of issuing fewer permits, which began in RY06 (20 permits) and continued during RY07–RY08 (10 permits annually). Additional restrictions may be proposed if the herd does not increase or if new data indicate the number of bison is well below the population objective. This herd is important not only because of the unique hunting opportunity it provides, but also because of its importance to bison conservation. A minimum viable population for bison may be as high as 400–500 individuals or more, with smaller populations having lower heterozygosity and fitness as well as being at

greater risk of inbreeding depression and genetic drift. Therefore, maintaining a minimum population of at least 300 animals may be important not only to allow a harvestable surplus, but also to maintain the genetic viability of the population. We recognize however, that improving habitat using controlled burns may be necessary to maintain a herd of this size, and that a population of 400–500 may not be possible due to habitat constraints.

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PREPARED BY:

Joshua M. Peirce
Wildlife Biologist II

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Roger J. Seavoy
Wildlife Biologist III

Robert O. Stephenson
Wildlife Biologist III

Please cite any information taken from this section, and reference as:

PEIRCE, J. M. 2010. Unit 19 bison. Pages 17–27 *in* P. Harper, editor. Bison management report of survey and inventory activities 1 July 2007 through 30 June 2009. Alaska Department of Fish and Game. Project 9.0. Juneau, Alaska.

TABLE 1 Farewell bison aerial composition surveys and estimated population size, 2000–2010

Survey date	Adults	Calves (%)		Bison observed	Estimated population size
5/30/00	234	31	(12)	265	350
6/18/01	157	31	(16)	188	350
1/30/02	34	1	(3)	35	350
9/3/02	32	6	(16)	38	350
5/7/03	130	15	(10)	145	350
11/16/03	109	n/a	n/a	109	350
8/05				163	[a]
4/6–7/06	82	12	(13)	94	94–107
4/25/07	68	11	(14)	79	100–150
4/20/08	187	8	(4)	195	[a]
6/19/08	144	31	(18)	175	[a]
8/21/08	186	31	(14)	217	[a]
4/5/09	149	0	(0)	149	[a]
6/3/09	174	30	(15)	204	[a]
7/9/09	138	26	(16)	164	[a]
8/12/09	164	15	(8)	179	[a]
4/7/10	169	1	(<1)	170	[a]

[a] Population size was not estimated because of unpredictable movements, low search effort, and/or the small number of radiocollared bison.

TABLE 2 Farewell bison harvest data by permit hunt, regulatory years 2004–2005 through 2008–2009

Hunt number	Regulatory year	Permits issued	Did not hunt (%)	Unsuccessful hunters[a] (%)	Successful hunters[a] (%)	Bulls (%)	Cows (%)	Unk	Total harvest
DI351 (Fall)	2004–2005	20	9 (45)	3 (27)	8 (73)	8 (100)	0 (0)	0	8
	2005–2006	20	5 (25)	3 (20)	12 (80)	8 (67)	3 (25)	1	12
	2006–2007	10	3 (30)	3 (43)	4 (57)	3 (75)	1 (25)	0	4
	2007–2008	5	1 (20)	1 (25)	3 (75)	2 (67)	1 (33)	0	3
	2008–2009	5	1 (20)	1 (25)	3 (75)	2 (67)	1 (33)	0	3
DI352 (Spring)	2004–2005	20	5 (25)	2 (13)	13 (87)	8 (62)	5 (38)	0	13
	2005–2006	20	3 (15)	1 (6)	16 (94)	6 (38)	10 (63)	0	16
	2006–2007	10	1 (10)	2 (22)	7 (78)	4 (57)	3 (43)	0	7
	2007–2008	5	0 (20)	1 (20)	4 (80)	1 (25)	3 (75)	0	4
	2008–2009	5	1 (20)	0 (0)	4 (100)	3 (75)	1 (25)	0	4

[a] Successful/Unsuccessful hunter information includes only those who hunted.

TABLE 3 Farewell bison harvest chronology by month/day, and percent of fall or spring harvest, regulatory years 2004–2005 through 2008–2009

	Harvest chronology by month/day					
	Fall			Spring		
Regulatory	9/1–10	9/11–20	9/21–30	3/1–10	3/11–20	3/21–31
year	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
2004–2005	1 (13)	3 (38)	4 (50)	8 (62)	3 (23)	2 (15)
2005–2006	4 (33)	4 (33)	4 (33)	8 (50)	6 (38)	2 (13)
2006–2007	0 (0)	2 (50)	2 (50)	1 (14)	3 (43)	3 (43)
2007–2008	0 (0)	1 (33)	2 (67)	0 (0)	0 (0)	4 (100)
2008–2009	1 (33)	1 (33)	1 (33)	0 (0)	4 (100)	0 (0)

TABLE 4 Farewell bison hunter residency and success, regulatory years 2004–2005 through 2008–2009

	Successful						Unsuccessful						
Regulatory year	Local[a] resident	Nonlocal resident	Non resident	Unk	Total	(%)	Local[a] resident	Nonlocal resident	Non resident	Unk	Total	(%)	Total hunters
2004–2005	0	20	1	0	21	(81)	0	5	0	0	5	(19)	26
2005–2006	3	21	4	0	28	(88)	0	4	0	0	4	(13)	32
2006–2007	1	9	1	0	11	(69)	0	5	0	0	5	(31)	16
2007–2008	0	6	1	0	7	(78)	0	1	1	0	2	(22)	9
2008–2009	0	6	1	0	7	(88)	0	1	0	0	1	(13)	8

[a] Local residents are hunters who live in Unit 19.

TABLE 5 Farewell bison harvest by primary transport method, regulatory years 2004–2005 through 2008–2009

Regulatory year	Harvest by transport method				
	Airplane (%)	3- or 4-wheeler (%)	Snowmachine (%)	Unknown or other (%)	*n*
2004–2005	20 (77)	0 (0)	5 (19)	1 (4)	26
2005–2006	18 (56)	0 (0)	11 (34)	3 (9)	32
2006–2007	13 (81)	0 (0)	3 (19)	0 (0)	16
2007–2008	7 (78)	0 (0)	2 (22)	0 (0)	9
2008–2009	3 (38)	1 (13)	4 (50)	0 (0)	8

WILDLIFE MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO Box 115526
Juneau, AK 99811-5526

BISON MANAGEMENT REPORT

From: 1 July 2007
To: 30 June 2009[1]

LOCATION

GAME MANAGEMENT UNIT: 20D (5637 mi^2)

HERD: Delta

GEOGRAPHIC DESCRIPTION: Central Tanana Valley near Delta Junction

BACKGROUND

The ancestors of modern bison first colonized North America after migrating from Asia to Alaska over the Bering Land Bridge a few hundred thousand years ago (Reynolds et al. 1982). During the last 10,000 years two modern subspecies developed: wood bison (*Bison bison athabascae*) in Alaska and parts of Canada, and plains bison (*B. b. bison*) in Canada and the contiguous United States. Bison were once the most abundant large mammal in Alaska, but were largely extirpated about 200–300 years ago probably due to a combination of changing habitat and unregulated hunting (Skinner and Kaisen 1947; Guthrie 1990, Stephenson et al. 2001). Wood bison probably lived along the Delta River near Delta Junction before their extirpation from Alaska (D. Guthrie, University of Alaska Fairbanks, personal communication).

In 1928, 23 plains bison were translocated from the National Bison Range in Montana to the Delta River. At the time, biologists were unaware of the existence of wood bison in Canada. By 1947 the herd had increased to 400 animals. Hunting began in 1950 and is now one of the most popular permit drawing hunts in the state. Hunting is used to manage the size of the herd. Delta bison have been translocated to other parts of Alaska, and 3 other herds have been established (i.e., Farewell, Chitina River, and Copper River herds).

As agriculture developed on their established range, the Delta bison herd (DBH) began to include hay and cereal grains in their fall and winter diets. In 1976 the State of Alaska made agricultural development a priority within the established range of the DBH, and large-scale agricultural land disposals began in 1978. Eventually bison began to negatively impact agricultural harvests by feeding on crops in the fall before harvest.

In 1979 the Alaska Legislature established the 90,000-acre Delta Junction Bison Range (DJBR) south of the Alaska Highway and adjacent to the Delta Agricultural Project (DAP). The purpose

[1] At the discretion of the reporting biologist, this unit report contains data collected outside the report period.

of the DJBR was to perpetuate free-ranging bison by providing adequate winter range and altering seasonal movements of bison to reduce damage to agriculture. In 1984 the legislature appropriated $1.54 million for DJBR development and increased the Delta bison permit hunt application fee from $5 to $10, with the intent that $5 from each application be used for DJBR management. Since 1984 the appropriated funds have been used to hire personnel, purchase equipment for forage management, and develop 2800 acres of bison forage on the DJBR in the Panoramic and Gerstle Field complexes.

Bison damage to farms in the DAP was significantly reduced in 1985 with the first substantial forage production on the DJBR. The DJBR forage development and management continued through this reporting period, reducing conflicts between bison and agriculture.

The Bison Range Youth Hunt Management Area was created in 2002 to regulate moose hunting in the fields of the DJBR. This is a drawing permit hunt that was implemented to reduce the impact of moose hunting on bison and bison forage management on the DJBR.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

Manage the DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

MANAGEMENT OBJECTIVES

Objective 1: Manage the DBH to maintain a herd size of approximately 360 bison at the precalving count.

Objective 2: Manage the DBH to maintain a sex ratio of no less than 50 bulls (≥ 1 year old):100 cows.

In addition to the management objectives above, the 2000–2005 Delta Bison Management Plan (DuBois and Rogers 2000) is still the current management plan for Delta bison herd management and includes the following goals and objectives, which were treated as activities during this report period.

Herd Health Management Goal: Ensure that the DBH remains healthy and free of any diseases that might threaten the herd or other wildlife species.

Objective 1: Monitor the DBH to determine if any diseases are present that might threaten the health of the herd or other wildlife species.

Objective 2: Prevent the transmission of diseases between livestock and the DBH.

Objective 3: If diseases are transmitted from livestock to the DBH, prevent the spread of diseases from bison to other wildlife species or to other livestock.

Herd Size and Composition Goal: Manage the DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

Bison Conflict Management Goal: Minimize conflicts between bison and the public, including, but not limited to, agriculture interests in the Delta Junction area.

Objective 1: Administer the Delta bison hunt to minimize landowner–hunter conflicts in order to help maintain bison and hunter access to private agricultural land to the greatest extent possible.

Objective 2: Enhance bison summer range west of the Richardson Highway to increase its attractiveness to the DBH to attempt to delay the herd's migration towards the DJBR and private agricultural lands.

Objective 3: Manage the DJBR to encourage the DBH to remain south of the Alaska Highway, and out of private agricultural land as late in the fall as possible, and to attract more bison to the DJBR in the winter and provide greater accessibility to the herd for bison hunters.

Objective 4: The department will provide assistance to the public regarding bison conflicts.

Bison Viewing Management Goal: Provide opportunities for nonconsumptive enjoyment of the DBH, such as bison viewing, interpretation, and education.

Objective 1: Investigate methods and funding sources other than bison permit fees to improve bison viewing opportunities for the public.

METHODS

HERD MANAGEMENT

Population Status and Trend

We used aerial censuses to monitor herd size. A Piper Super Cub (PA-18) fixed-wing aircraft was used to conduct visual searches and to locate aggregations that contained radiocollared bison during March–September. Bison aggregations were counted visually when possible, and groups that were difficult to count directly were photographed with a digital single lens reflex camera and counted from the photographs. We conducted replicate censuses each year and considered the prehunt population size to be the maximum number of bison counted during a single census.

A precalving population estimate was obtained by subtracting hunting mortality, estimates of wounding loss, and other known and estimated sources of mortality from the prehunt population count for the previous fall. In recent years, precalving population estimates were also verified at times by flying aerial surveys in late March, near the end of the hunting season, and during early May before the peak of calving (excluding neonates). If these aerial surveys resulted in a higher precalving population count it was used rather than the estimate.

Population Composition

Sex and age composition surveys were conducted from the ground by locating groups containing radiocollared bison. To obtain the best composition data we attempted to locate and count bison groups during the end of rut in August or September annually, when the entire herd tends to be

aggregated together. We usually conducted multiple surveys and the survey that resulted in the largest sample size was used to calculate composition data. We determined the sex and age of bison by observing them with 8–10×40 binoculars or a 15–60 power spotting scope. Bulls were differentiated from cows by body size, head size and shape, pelage, circumference of horn bases, horn shape, and presence of a penis sheath. Bulls were further classified into 4 different horn categories to estimate age structure for the bull segment of the population based on horn morphology. Yearlings were bulls with straight horns without any upward curvature. "Small bulls" were bulls with horn tips that were starting to curve upward (vertically relative to the horn base) but were not pointing straight up. "Medium bulls" were bulls with horn tips turned 90° vertical, relative to the horn bases. "Large bulls" had horns with tips curved inward toward the center of the skull. To aid in the classification of age relative to horn shape, photographs were taken when possible of all bison killed by hunters. Horn morphology relative to age will be evaluated by comparing horn shape to age based on tooth eruption and wear and reported in a future management report. We summarized composition data by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY07 = 1 Jul 2007–30 Jun 2008).

Distribution and Movements

We monitored bison movements by locating radiocollared bison and from reports by people who observed and reported bison moving through the area. Most bison locations were obtained from fixed-wing aircraft; however, we also obtained some locations by ground tracking.

To attach radio collars, we usually captured bison from a Robinson R-44 helicopter by immobilizing them with darts from a Cap-Chur™ rifle or short-range pistol. Occasionally bison were darted from the ground after approaching them closely. Darts were loaded with 5 mg carfentanil citrate (Wildnil®, Wildlife Pharmaceuticals, Fort Collins, Colorado, USA) and 60 mg xylazine hydrochloride (Anased®, Lloyd Laboratories, Shenandoah, Iowa, USA). Once immobilized, bison were fitted with radio collars, and then given an intramuscular injection of naltrexone hydrochloride (Trexonil®, Wildlife Pharmaceuticals) at a dose of 100 mg naltrexone citrate/mg carfentanil citrate to reverse the immobilization.

Disease Management

In RY07, bison hunters were asked to collect approximately 30 ml of blood from their kills. These samples were centrifuged and serum was removed by aspiration. Sera were frozen until tested for diseases that included epizootic hemorrhagic disease, bluetongue, infectious bovine rhinotracheitis, bovine viral diarrhea, respiratory syncytial virus, parainfluenza 3, *Brucella suis* IV, *Leptospira interrogans*, *Toxoplasma gondii*, and Q fever. Samples of uncoagulated whole blood were also collected for future genetic work. Hunters also collected fecal samples to test for Johne's disease. No biological specimens were collected in RY08 due to funding shortages.

Harvest Management

Bison hunters were assigned a beginning hunt date starting 1 October, and a new group of hunters was started every 5 days. Once hunters were eligible to start hunting, they had until the end of the season on 31 March to hunt. Bison hunters attended a mandatory prehunt orientation. The purpose of the orientation was to teach hunters to differentiate between bulls and cows, to discuss land status in the hunt area, and to give hunters supplies and instructions for collecting biological samples.

Bison hunters were required to check out within 24 hours after killing a bison. They completed a questionnaire including date and location of kill, number of days afield, number of shots required, weight of bullet, and caliber of firearm. If hunters checked out after normal office hours, they put the questionnaire, biological samples, and the distal end of the lower jaw in a drop box at the Delta Junction ADF&G office. If hunters checked out during working hours, we examined the carcass to record tooth eruption and to extract an I1 tooth from bison that had all permanent teeth. We sent teeth to Matson Laboratories (PO Box 308, Milltown, Montana, USA) for aging. Horns were measured according to the Boone and Crockett Club scoring system and photographed. Harvest was monitored using permit harvest reports and questionnaires. Harvest data were summarized by regulatory year.

DJBR MANAGEMENT

The perennial grasses, nugget bluegrass (*Poa pratensis*) and arctared fescue (*Festuca rubra*), were fertilized on the DJBR each year with N60-P20-K0-S10 at the rate of 200 lb/acre. Fertilizer was applied with an 8-ton capacity broadcast spreader pulled by a John Deere 4250 tractor.

Oats were planted each year on acreage being treated to control bluejoint reedgrass (*Calamagrostis canadensis*). Prior to planting, fields were fertilized with about 200 lb/acre of N60-P20-K0-S10 by broadcasting fertilizer onto the fallow soil with a broadcast spreader. Approximately 100 lb/acre of oat seed were spread using the broadcast spreader and the field was disked with a field disk to incorporate the fertilizer and seed into the soil.

We analyzed forage quality by collecting forage subsamples and pooling them into 1 composite sample by forage type and location. Samples were sent to the University of Alaska Plant and Soils Lab in Palmer, Alaska for analysis. Samples were analyzed moisture-free and as-fed for relative feed value (RFV), dry matter, crude protein, phosphorus, potassium, calcium, acid-detergent fiber, in vitro dry matter disappearance, total digestible nutrients, metabolizable energy, and net energy-lactation. Generally, RFV was reported to compare forage quality.

We provided trace element mineral blocks for the bison in the Panoramic and Gerstle Fields and water in stock water tanks was supplied by a well in the Panoramic Fields. We monitored rain gauges in both the Panoramic and Gerstle Fields.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

RY07. The prehunt population size for RY07 was 516 bison (Table 1), which was the largest herd size recorded since at least 1983. The precalving population of 412 in spring 2008 (Table 1) was substantially above the precalving population objective of 360.

RY08. The prehunt herd size was 494 bison (Table 1). The precalving population of 370 in spring 2009 was a reduction from fall 2007 that resulted from more permits being issued to compensate for declining hunter success rates; it was only 10 bison above the population objective.

Population Composition

RY07. I estimated sex and age composition from a sample of 214 bison counted during 20–21 September 2007. Calf survival was 55 calves:100 cows and calves composed 26% of the sample. Adult and yearling cows composed 48% of the sample.

The bull:cow ratio was 55:100, which met the objective, with a yearling bull ratio of 13:100 cows. We observed 56 bulls during composition surveys and classified 48 based on horn size and shape. The sample consisted of 27% yearlings, 29% small bulls, 33% medium bulls, and 10% large bulls (Table 3).

RY08. I estimated sex and age composition from a sample of 168 bison counted during 4–18 September 2008 (Table 2). Calf survival was 54 calves:100 cows and calves composed 24% of the sample. Adult and yearling cows composed 44% of the sample.

The bull:cow ratio was 73:100, which met the objective, with a yearling bull:cow ratio of 36:100. We observed 54 bulls during composition surveys and all were classified based on horn size and shape. The sample consisted of 50% yearlings, 9% small bulls, 31% medium bulls, and 9% large bulls (Table 3).

Distribution and Movement

RY07. During an 8 July 2007 aerial survey, the bison were still located along the Delta River from the Mississippi Impact Area south to near McGinnis Creek. The first bison observed on the Panoramic Fields in RY07 were 12 seen on 16 July. On 26 July, much of the herd had migrated to the DJBR and approximately 325 bison were observed from the ground in the Panoramic Fields.

During a 4 August aerial survey, bison were scattered from the Delta River to private agricultural lands. Most bison were located on the DJBR, with 292 bison in the Panoramic Fields and 14 in the Gerstle Fields, and an additional 50 on private agricultural lands. During a 21 August aerial survey, all bison were located on either private agricultural land, where most of the herd was located, or on the DJBR, where approximately 30 were located in the Panoramic Fields and 41 were in the Gerstle Fields. However, the Delta River was not searched due to turbulence from high winds.

During a 19 September aerial survey, no bison were located on the Delta River. One hundred forty-nine bison were located in the Panoramic Fields and the remainder bison were on private agricultural lands. I conducted a ground based composition survey on 20–21 September and located 91 bison on agricultural land and 114 bison on the Panoramic Fields. During aerial surveys on 24 and 25 September, all bison were located north of the Alaska Highway on private agricultural lands.

In 2008, a 21 March survey was flown to estimate the posthunting (precalving) population; 297 bison were observed with 251 located on the Texas Range and Washington Impact areas of Donnelly Training Area East. Only 22 bison were located in the DAP, with an additional 3 in the Volkmar Flats north of the Tanana River and 6 on a gravel bar in the Tanana River. The survey was repeated on 24 March, when 331 bison were located and most were again on Donnelly Training Area East.

An aerial survey on 26 May 2008 located 377 adults and 92 calves, primarily on Donnelly Training Area East, with 22 bison as far south as Black Rapids Glacier. I had received a report of 8 bison being seen along Delta Creek in Unit 20A with 2 located at 64°01.57N and 146°23.75W and 6 located at 63°56.38N and 146°14.34W. We searched this area on 28 May and located 5 medium aged bull bison at 64°03.70N and 146°20.90W, near where they had been reported earlier. This is the farthest west bison have been observed in several decades. I made several other flights to locate these bison but was not able to find them again. About the same time, I also received a report of 5 adult and 2 calf bison observed in the DAP.

A 16 June 2008 aerial survey resulted in 473 bison observed along the Delta River floodplain from as far south as McGinnis Creek and north to approximately the northern end of Washington Impact Area. During a 25 June aerial survey 302 bison were observed with similar distribution, but the southernmost group was observed near Pillsbury Creek.

On 8 July 2007, a female bison was radiocollared after being darted from a ground blind on the Texas Range of Donnelly Training Area East, where the bison had been attracted to salt blocks. The temperature was approximately 70°F. The bison was immobilized 4 minutes after being darted. Recovery time was 5 minutes 14 seconds after administration of the antagonist. The time from initial darting to complete recovery was 14 minutes.

RY08. An aerial survey along the Delta River on 10 July 2008 located 467 bison primarily in Washington Impact Area and Texas Range with about 95 bison north to around Mississippi Impact Area.

During an aerial survey on 3 August, I located the herd in four aggregations totaling 448 bison. Two hundred twenty-five were located in the Panoramic Fields and 213 were located north of the Alaska Highway on private agricultural lands. On 4 August, 470 bison were observed, with 82 bison in the Panoramic Fields and 117 in the Gerstle Fields of the DJBR, and 271 on private agricultural land, with the largest group of 172 on Tract F. I flew another survey on 7 August and located approximately 442 bison, with 87 on the DJBR and the remainder north of the Alaska Highway. I observed 407 during a 19 August aerial survey, with 74 on the DJBR, 258 on private Tract T2, and 75 on Tract U. On 24 August approximately 436 bison were observed during an aerial survey, with 84 on the Panoramic Fields and the remainder north of the Alaska Highway.

The highest population estimate in RY08 occurred during an aerial survey on 5 September when 494 bison were counted on private agricultural land. On 8 September I counted 459 bison north of the Alaska Highway. The last aerial survey of fall 2008 occurred on 24 September. A large group of bison was observed on the Panoramic Fields where I counted approximately 181 bison, with an additional 261 north of the Alaska Highway.

MORTALITY

Harvest

Season and Bag Limit. The resident and nonresident bison hunting season was 20 July–31 March during the RY07–RY08 hunting seasons; however, hunting does not routinely begin until 1 October each year so that farmers in the DAP can finish harvesting their crops before the hunt starts, when bison being pursued by hunters could damage crops.

Hunters participated in the hunt by drawing permit. In RY07, Hunt DI403 was for bulls only and hunt DI404 was for cows only. In RY08, Hunt DI403 was for either-sex bison. The department and the governor's office also issue special permits some years, which are designated as SI405. Recipients of these permits were required to follow all regulations and permit conditions that applied to the drawing permits. The following conditions applied to all permits:

- Permittees were required to attend an orientation course before hunting. Hunter orientations were scheduled every 5 days coinciding with the hunt period starting dates.

- Permittees were assigned specified periods to begin hunting that were determined by the order permits were drawn.

- Permittees were required to use a rifle capable of shooting a 200-grain bullet with 2000 ft/lb of retained energy at 100 yards. Bows had to comply with 5 AAC 92.075(4) to be a legal means of harvest. Crossbows were prohibited. Certain muzzleloading firearms qualified.

Alaska Board of Game Actions and Emergency Orders. At the January 2008 Board of Game meeting, the Board amended and passed proposal 8 which changed the statewide bison bag limit to 1 permit every 10 years for residents and 1 permit per lifetime for nonresident hunters.

Human-Induced Mortality.

RY07 — Human-induced mortality was estimated to be 111 bison (Table 4) during the general drawing permit hunts DI403 and DI404, and special permit hunt DI405. Hunters killed 99 bison during the DI403 and DI404 hunts (48 bulls and 51 cows), 1 bull bison during the DI405, and estimated wounding loss was 11 (7% of the number of permits issued). Hunters with bull-only permits (DI403) killed 43 bulls and 2 cows and hunters with cow-only permits (DI404) killed 49 cows and 5 bulls (Table 5). The reported illegal harvest rate was 7%.

Successful hunters with bull permits (DI403) hunted a mean of 10.8 days and unsuccessful hunters hunted a mean of 12.6 days. Successful hunters with cow permits (DI404) hunted a mean of 7.5 days and unsuccessful hunters hunted a mean of 3.4 days (Table 6).

RY08 — Human-induced mortality was estimated to be 125 bison (Table 4) during the general drawing permit hunts DI403 and DI404. Hunters killed 113 bison (41 bulls and 72 cows) during DI403 and DI404, and estimated wounding loss was 12 (7% of the number of permits issued). Hunters with either-sex permits (DI403) killed 38 bulls and 36 cows. Either-sex permits were issued in an effort to increase hunter success to meet the population objective. Hunters with cow-only permits (DI404) killed 36 cows and 3 bulls (Table 5). The reported illegal harvest (harvest without a permit) rate was 0%. There were 2 special permits issued (SI405) in RY08 and these hunters killed 1 bull bison, bringing the total estimated mortality to 126, with 114 reported killed by hunters.

Successful hunters with either-sex permits (DI403) hunted a mean of 6.4 days and unsuccessful hunters hunted a mean of 10.8 days. Successful hunters with cow permits (DI404) hunted a mean of 6.8 days and unsuccessful hunters hunted a mean of 12.4 days (Table 6).

Permit Hunts.

RY07 — The department received 15,397 applications for DI403 and DI404 permits (Table 7).

RY08 — The department received 16,597 applications for DI403 and DI404 permits (Table 7).

Hunter Residency and Success.

RY07 — Most Delta bison hunters continued to be nonlocal Alaska residents (92%). Permit holders in both DI403 and DI404 who reported hunting had a 70% overall success rate (Table 8).

RY08 — Most Delta bison hunters continued to be nonlocal Alaska residents (95%). Permit holders for hunts DI403 and DI404 who reported hunting had an overall success rate of 71% (Table 8). Success during RY07–RY08 remained <90% as it has since RY97.

Harvest Chronology.

RY07 — Harvest chronology was similar to chronology in previous years, with most harvest (49%) in October and November, the harvest rate slowing during December–January and then increasing during March (Table 9).

RY08 — Harvest chronology was similar to chronology in previous years, with most harvest (52%) in October and November, the rate slowing during December–January and increasing during February and March (Table 9).

Transport Methods.

Highway vehicles and snowmachines continued to be the most common transport methods (Table 10). Hunters typically use highway vehicles most commonly in the early portion of the season before snow depth prohibits their use. Hunters use snowmachines more commonly once snow makes highway vehicles more difficult to use.

RY07 — Most successful bison hunters used highway vehicles (85%), and 7% used snowmachines (Table 10).

RY08 — Successful bison hunters used highway vehicles in 70% of their hunts. Snowmachines were the second most common mode of transportation and were used by 21% of successful hunters (Table 10).

Harvest Locations.

RY07 — Most bison (72%) were killed on private agricultural lands in the DAP (Table 11). Sixteen percent were killed on the DJBR and 11% were killed in other areas.

RY08 — Most bison (73%) were killed on private agricultural lands in the DAP (Table 11). Twenty-three percent were killed on the DJBR and 4% were killed in other areas.

Other Mortality

Natural mortality is rarely documented for the DBH. Humans caused most nonhunting mortality through wounding loss, road kills, trapper snares, and other factors.

Disease Management

Disease transmission from domestic livestock in the Delta Junction area was the greatest potential source of nonhunting mortality. Cattle in the area have had infectious bovine rhinotracheitis, bovine viral diarrhea, bovine respiratory syncytial virus, infectious bovine kerato conjunctivitis, parainfluenza 3 (PI3), Johne's disease (present in Alaska livestock but not verified from Delta Junction), and *Neospora caninum* (D. Quarberg and C. Crusberg, local domestic livestock producers, personal communication, 2008).

Results of disease sampling during RY07–RY08 are not available at this time.

HABITAT

RY07 — Approximately 700 acres of nugget bluegrass and 50 acres of arctared fescue were fertilized on the Panoramic and Gerstle Fields at a cost of $18,245. Grasses were fertilized during 17 May–7 June.

Approximately 375 acres of Derby oats were planted in the Panoramic and Gerstle Fields. No oats were planted in May; June plantings produce higher quality forage, but less quantity when bison migrate to the DJBR in the fall, which helps to accomplish the goal of reducing depredation on agricultural crops. The following oat plantings were tested for forage quality:

Planting Date	Location/Acres	RFV
7 Jun	Panoramic Fields, 35 acres	126
19 Jun	Panoramic Fields, 80 acres	143
27 Jun	Panoramic Fields, 50 acres	158
30 Jun	Gerstle Fields, 75 acres	147

Bluegrass was sampled from both the Panoramic and Gerstle Fields on 28 August. The Panoramic sample had an RFV of 104 and the Gerstle sample had a RFV of 108.

Approximately 125 acres were disked and left fallow in the Panoramic Fields to control bluejoint reedgrass. Approximately 600 acres were mowed on the Panoramic and Gerstle Fields to kill unwanted grasses and trees. A number of round, consolidated berm piles were removed from the Panoramic Fields totaling approximately 5 acres of area.

Bison drank approximately 8,300 gallons from the water tanks. One of the stock tanks was replaced. Rainfall measurements on the DJBR totaled 12.60 inches on the Panoramic Fields and 6.10 inches on the Gerstle Fields.

RY08 — Approximately 700 acres of nugget bluegrass and arctared fescue were fertilized in spring at a cost of $20,008. Grasses were fertilized 28 May–27 June. An additional 120 acres of bluegrass was fertilized on the Panoramic Fields on 2–3 July at a cost of $4,850.

Approximately 425 acres of Athabascan oats were planted in the Panoramic Fields and Gerstle Fields, with 375 acres in the Panoramic Fields and 50 acres in the Gerstle Fields from 6 June–1 July. The following oat plantings were tested for forage quality:

Date	Location/Acres	RFV
6 Jun	Panoramic Fields, 80 acres	129
16 Jun	Panoramic Fields, 35 acres	183
20 Jun	Panoramic Fields, 80 acres	166
26 Jun	Panoramic Fields, 80 acres	178
1 July	Gerstle Fields, 50 acres	237

Nugget bluegrass sampled in the Panoramic and Gerstle Fields on 29 August had RFV values of 148 and 130 respectively.

Approximately 10 acres of nugget bluegrass were planted in the Panoramic Fields on acreage that had been fallow for several years to kill bluejoint reedgrass.

Approximately 125 acres were disked and left fallow on the Panoramic Fields to control bluejoint reedgrass. Approximately 600 acres were mowed on the Panoramic and Gerstle Fields to control woody vegetation. A number of round, consolidated berm piles were removed from approximately 5 acres of the Panoramic Fields.

Bison drank approximately 8,837 gallons of water from the stock tanks. Rainfall measurements on the DJBR totaled 9.10 inches on the Panoramic Fields and 7.10 inches on the Gerstle Fields. Anecdotal observations indicate this was a cold and wet growing season, with crops approximately 3 weeks behind the normal growing cycle.

During July 2008, the U.S. Army created a 35 acre bison food plot on Donnelly Training Area East, located south of Big Lake. The cleared acreage was planted with nugget bluegrass and fertilized.

DELTA BISON WORKING GROUP ACTIVITIES

The Delta Bison Working Group (DBWG) held a series of meetings during RY08 to work toward updating the 2000–2005 Delta Bison Management Plan. The meetings were well attended by the DBWG members; agency representatives including Alaska Department of Natural Resources, Division of Agriculture; Alaska Department of Fish and Game; Alaska Department of Public Safety; and Delta Chapter of the Alaska Farm Bureau; as well as numerous members of the public. Minutes of these meetings are on file at the ADF&G offices in Delta Junction and Fairbanks. The planning process was ongoing at the end of this reporting period (30 June 2009).

On 27 April 2009, DBWG member Don Quarberg presented the DBWG with a summary list of ideas that had been discussed and/or tried in the past to reduce conflicts between bison and agriculture. That list is on also on file at the ADF&G offices in Delta Junction and Fairbanks.

CONCLUSIONS AND RECOMMENDATIONS

Herd size was above the population objective in RY07 and RY08 due to declining hunter success rates. Consequently, increased numbers of drawing permits were issued in RY07 and RY08, with bull-only permits changed to either-sex permits in RY08 to increase hunter success. Herd productivity and calf survival continued within the normal range, with calf:cow ratios ranging

from 54–55:100 and 24–26% calves in the herd during RY07–RY08. The bull:cow ratio objective was met with ratios ranging 55–73 bulls:100 cows.

Herd movements showed no major changes, with the majority of the DBH moving from the Delta River to the DJBR in mid to late July and moving into private agricultural lands in approximately mid August. Based on anecdotal observations, we feel that implementing the Bison Range Youth Hunt Management Area in RY06 improved bison use of the DJBR. A small group of medium-aged bulls was located in Unit 20A on Delta Creek, west of their normal range. The problematic trend of some bison calving east of the Delta River continued when 5 adults with 2 neonates were reported on private agricultural land in mid May. It may be advisable to consider harvesting those bison that remain east of the Delta River in the late spring or those that move there early in the fall. However, extending the bison hunting season into these times will have an impact on farming operations. Before implementing a bison season opening prior to 1 October, private landowners should reach a consensus that this action is worthwhile. That consensus has not been reached.

The 4 bison conflict management objectives in the Delta Bison Management Plan were met. The DJBR met the legislative intent to reduce conflicts between bison and agriculture and continued to benefit farmers by delaying and/or reducing bison movements into the DAP; however, we continue to strive to improve the situation. The bison hunt was administered in a manner that minimized conflicts with private landowners. A 35-acre bison food plot was created on Donnelly Training Area East, south of Big Lake. It was not necessary for the department to provide assistance to the public experiencing bison conflicts because there were no requests.

The greatest challenges to DJBR management continued to be 1) controlling the native grass, bluejoint reedgrass, and woody regrowth with nonherbicidal techniques; 2) developing more cost-effective forage management techniques; and 3) holding bison on the DJBR as late in the fall as possible. Controlling bluejoint reedgrass and woody regrowth is a particular challenge in the Gerstle Fields given current funding and staffing levels. We will continue work to improve these aspects of DJBR management.

Hunter success remained low (<90%) relative to earlier years. If hunter success continues to remain low or trend lower, it may be necessary to adjust hunt administration to increase hunter success.

The 2000–2005 Delta Bison Management Plan is still the current management plan for Delta bison herd management. The following objectives in the plan will continue to be conducted as management activities in the next report period.

Herd Health Management Goal: Ensure that the DBH remains healthy and free of any diseases that might threaten the herd or other wildlife species.

Objective 1: Monitor the DBH to determine if any diseases are present that might threaten the health of the herd or other wildlife species.

Objective 2: Prevent the transmission of diseases between livestock and the DBH.

Objective 3: If diseases are transmitted from livestock to the DBH, prevent the spread of diseases from bison to other wildlife species or to other livestock.

Herd Size and Composition Goal: Manage the DBH to accomplish a reasonable balance between providing the greatest opportunity to hunt and view bison while keeping negative impacts to private property to a minimum.

Bison Conflict Management Goal: Minimize conflicts between bison and the public, including, but not limited to, agriculture interests in the Delta Junction area.

Objective 1: Administer the Delta bison hunt to minimize landowner–hunter conflicts in order to help maintain bison and hunter access to private agricultural land to the greatest extent possible.

Objective 2: Enhance bison summer range west of the Richardson Highway to increase its attractiveness to the DBH to attempt to delay the herd's migration towards the DJBR and private agricultural lands.

Objective 3: Manage the DJBR to encourage the DBH to remain south of the Alaska Highway, and out of private agricultural land as late in the fall as possible, and to attract more bison to the DJBR in the winter and provide greater accessibility to the herd for bison hunters.

Objective 4: The department will provide assistance to the public regarding bison conflicts.

Bison Viewing Management Goal: Provide opportunities for nonconsumptive enjoyment of the DBH, such as bison viewing, interpretation, and education.

Objective 1: Investigate methods and funding sources other than bison permit fees to improve bison viewing opportunities for the public.

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PREPARED BY:

Stephen D. DuBois
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Robert O. Stephenson
Wildlife Biologist III

Please cite any information taken from this section, and reference as:

DUBOIS, S. D. 2008. Unit 20D bison. Pages 28–53 *in* P. Harper, editor. Bison management report of survey and inventory activities 1 July 2007–30 June 2009. Alaska Department of Fish and Game. Project 9.0. Juneau, Alaska, USA.

TABLE 1 Delta bison precalving and postcalving population estimates, 1983–2007. Unless otherwise noted, precalving estimates were calculated by subtracting known mortality from the previous prehunt population estimate.

Calendar Year	Spring precalving population estimate	Fall prehunt population estimate
1983	355	360
1984	300	356
1985	285	378
1986	300	361
1987	275	396
1988	337	426
1989	366	432
1990	373	440
1991	378	484[a]
1992	384	482
1993	392	465
1994	340	446[b]
1995	397	485
1996	375	496
1997	381[c]	474
1998	349	414–471
1999	335–393	434
2000	359	453
2001	361	471
2002	373	476
2003	365	407
2004	327[d]	421
2005	332[e]	402
2006	353	430
2007	397[d]	516
2008	412	494
2009	370	435

[a] Includes 17 domestic bison that escaped and were incorporated into the herd.
[b] Includes 15 domestic bison that escaped and were incorporated into the herd in May 1994.
[c] Includes 6 domestic bison that escaped and were incorporated into the herd in Apr 1997.
[d] Calculated based on maximum number of non-neonatal bison seen during late Mar through early May surveys.

TABLE 2 Delta bison fall ground composition count data and estimated population size, regulatory years 1992–1993 through 2007–2008

Regulatory year	Bulls:100 Cows	Yrlg bulls: 100 Cows	Calves:100 Cows	Adults		Percent yrlg bulls	Percent calves	Total sample size	Estimated prehunt population size
				% Bulls	% Cows[a]				
1992–1993	87	14	46	31	43	6	20	381	482
1993–1994	67	21	62	20	44	9	27	308	465
1994–1995	70	21	53	24	45	7	24	172	446[b]
1995–1996	87	22	52	27	42	9	22	231	485
1996–1997	65	13	54	24	46	6	25	279	496[c]
1997–1998	53	3	47	25	50	2	24	200	474
1998–1999	48	9	53	19	50	5	27	354	414–471
1999–2000	54	8	43	22	51	4	22	270	434
2000–2001	63	18	58	14	48	9	28	272	453
2001–2002	68	11	57	23	45	5	25	278	471
2002–2003	87	19	59	27	41	8	24	229	476
2003–2004	60	26	45	16	49	13	22	266	407
2004–2005	61	10	42	23	51	5	21	251	421
2005–2006	71	20	47	23	46	9	22	321	402
2006–2007	63	13	59	27	43	5	25	241	430
2007–2008	55	13	55	20	48	6	26	214	494
2008–2009	73	36	54	16	44	16	24	168	435

[a] Includes yearlings and adult cows.
[b] Includes 15 domestic bison that escaped and were incorporated into the herd.
[c] Includes 6 domestic bison that escaped and were incorporated into the herd.

TABLE 3 Percent[a] Delta bull bison with different horn categories based on horn morphology, 1997–2008

	Yearling	Horn Category (%)			
Month/Year	(%)	Small	Medium	Large	*n*
Sep 1997	6	45	37	12	49
Sep 1999	19	44	27	10	59
Sep 2000	36	12	25	28	61
Sep 2001	18	26	39	18	78
Sep 2002	23	23	34	20	79
Sep 2003	44	29	17	10	77
Sep 2004	19	22	49	10	69
Sep 2005	29	16	46	10	103
Sep 2006	30	28	14	28	43
Sep 2007	27	29	33	10	48
Sep 2008	50	9	31	9	54

[a] Percentages may not total 100% due to rounding.

TABLE 4 Delta bison harvest and accidental death, regulatory years 1986–1987 through 2008–2009

Regulatory year	Hunter harvest								
	Reported					Estimated			Other	
	M	(%)	F	(%)	Total	Unreported[a]	Illegal	Total	mortality	Total
1986–1987	15	(24)	47	(76)	62	5	0	5	0	67
1987–1988	35	(76)	11	(24)	46	4	0	4	0	50
1988–1989	21	(47)	24	(53)	45	4	0	4	0	49
1989–1990	22	(37)	38	(63)	60	5	0	5	0	65
1990–1991	59	(69)[b]	27	(31)	86	6	0	6	2	94
1991–1992	50	(54)	43	(46)	93	7	0	7	0	100
1992–1993	62	(65)	33	(35)	96	7	0	7	3	106
1993–1994	51	(47)	58	(53)	109	8	0	8	0	117
1994–1995	20	(53)	18	(47)	38	3	0	3	4	45
1995–1996	60	(57)[b]	46	(43)	106	8	0	8	0	114
1996–1997	56	(54)	47	(46)	103	8	0	8	6	117
1997–1998	57	(48)	61	(52)	118	9	0	9	8	135
1998–1999	27	(38)[b]	44	(62)[c]	72	7	0	7	4	83
1999–2000	30	(45)[b]	37	(55)	67	7	0	7	3	77
2000–2001	36	(51)	35	(49)	72	7	0	7	0	79
2001–2002	51	(52)	47	(48)	98	9	0	9	0	107
2002–2003	54	(51)	51	(49)	105	9	0	9	0	114
2003–2004	43	(56)	34	(44)	77	9	0	9	0	86
2004–2005	33	(72)	13	(28)	46	5	0	5	2	53
2005–2006	27	(60)	18	(40)	45	5	0	5	2	52
2006–2007	48	(80)	12	(20)	60	6	0	6	0	66
2007–2008	49	(49)	51	(51)	100	11	0	11	0	111
2008–2009	41	(36)	72	(64)	113	12	0	12	0	125

[a] Estimated wounding loss equal to 7% of the permits issued.
[b] One bull was harvested via the Alaska Wildlife Safeguard raffle.
[c] One cow was harvested via a Governor's permit.

TABLE 5 Reported Delta bison harvest data by permit hunt, regulatory years 1994–1995 through 2008–2009

Hunt no.	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful permittees	Percent successful permittees	Bulls (%)	Cows (%)	Unk	Total harvest
DI403	1994–1995	20	5	0	95	19 (100)	0 (0)	0	19
	1995–1996	70	6	10	85	58 (97)	2 (3)	0	60
	1996–1997	70	4	9	86	53 (88)	7 (12)	0	60
	1997–1998	60	3	8	88	51 (96)	2 (4)	0	53
	1998–1999	45	2	29	69	26 (84)	4 (13)	1	31
	1999–2000	50	2	34	64	29 (91)	3 (9)	0	32
	2000–2001	50	10	16	74	35 (95)	2 (5)	0	37
	2001–2002	70	1	30	70	47 (96)	2 (4)	0	49
	2002–2003	70	3	23	74	51 (98)	1 (2)	0	52
	2003–2004	70	7	34	59	40 (98)	1 (2)	0	41
	2004–2005	50	10	26	64	32 (100)	0 (0)	0	32
	2005–2006	35	9	22	69	24 (100)	0 (0)	0	24
	2006–2007	65	2	18	80	47 (90)	5 (10)	0	52
	2007–2008	80	11	33	56	43 (96)	2 (4)	0	45
	2008–2009[c]	100	7	19	74	38 (51)	36 (49)	0	74
DI404	1994–1995	20	0	5	95	1 (5)	18 (95)	0	19
	1995–1996	50	2	6	92	2 (4)	44 (96)	0	46
	1996–1997	50	0	12	86	3 (7)	40 (93)	0	43
	1997–1998	70	3	4	93	6 (9)	59 (91)	0	65
	1998–1999	55	5	24	71	0 (0)	39 (100)	0	39
	1999–2000	50	6	26	68	0 (0)	34 (100)	0	34
	2000–2001	50	8	20	70	1 (3)	33 (94)	1	35
	2001–2002	60	2	17	82	4 (8)	45 (92)	0	49
	2002–2003	65	3	15	82	3 (6)	50 (94)	0	53
	2003–2004	60	3	37	60	3 (8)	33 (92)	0	36
	2004–2005	25	12	32	56	1 (7)	13 (93)	0	14
	2005–2006	30	0	30	70	3 (14)	18 (86)	0	21
	2006–2007	15[d]	7	36	57	1 (13)	7 (88)	0	8
	2007–2008	75	4	24	72	5 (9)	49 (91)	0	54
	2008–2009	70	4	40	56	3 (8)	36 (92)	0	39

Hunt no.	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful permittees	Percent successful permittees	Bulls (%)	Cows (%)	Unk	Total harvest
SI405	1998–1999	2[a,b]	0	0	100	1 (50)	1 (50)	0	2
	1999–2000	1[a]	0	0	100	1 (100)	0 (0)	0	1
	2000–2001	2[a,b]	0	0	100	2 (100)	0 (0)	0	2
	2001–2002	1[a]	0	0	100	1 (100)	0 (0)	0	1
	2002–2003	0	0	0	0	0 (0)	0 (0)	0	0
	2003–2004	1[a]	0	0	100	0 (0)	1 (100)	0	1
	2004–2005	0	0	0	0	0 (0)	0 (0)	0	0
	2005–2006	0	0	0	0	0 (0)	0 (0)	0	0
	2006–2007	0	0	0	0	0 (0)	0 (0)	0	0
	2007–2008	1	0	0	100	1 (0)	0 (0)		
	2008–2009	2	0	50	50	1 (100)	0 (0)		1
Totals for all permit hunts	1994–1995	40	3	3	95	20 (53)	18 (47)	0	38
	1995–1996	120	4	8	88	60 (57)	46 (43)	0	106
	1996–1997	120	3	10	86	56 (54)	47 (46)	0	103
	1997–1998	130	3	6	91	57 (48)	61 (52)	0	118
	1998–1999	102	4	26	71	27 (38)	44 (61)	1	72
	1999–2000	101	4	30	66	30 (45)	37 (55)	0	67
	2000–2001	102	7	18	73	38 (52)	35 (48)	1	74
	2001–2002	131	2	23	75	51 (52)	47 (48)	0	98
	2002–2003	135	4	19	78	54 (51)	51 (49)	0	105
	2003–2004	130	5	36	59	43 (56)	34 (44)	0	77
	2004–2005	75	11	28	61	33 (72)	13 (28)	0	46
	2005–2006	65	5	26	69	27 (60)	18 (40)	0	45
	2006–2007[d]	80	3	22	76	48 (80)	12 (20)	0	60
	2007–2008	156	8	28	64	49 (49)	51 (51)	0	100
	2008–2009	172	6	28	66	42 (37)	72 (63)		114

[a] One permit was issued for an Alaska Fish and Wildlife Safeguard raffle.
[b] One permit was issued for a Governor's permit.
[c] The DI403 hunt was for either sex bison
[d] One hunter did not report

TABLE 6 Delta bison mean number of days hunted for hunts DI403 and DI404, regulatory years 1991–1992 through 2008–2009

Regulatory year	Mean number of days hunted			
	Hunt DI403		Hunt DI404	
	Successful	Unsuccessful	Successful	Unsuccessful
1991–1992	3.8	4.3	3.5	15.6
1992–1993	2.2	1.0	1.9	0.0[a]
1993–1994	4.3	7.2	3.5	5.0
1994–1995	3.0	0.0[a]	3.0	2.0
1995–1996	5.1	10.1	3.8	5.0
1996–1997	6.1	14.8	4.3	6.8
1997–1998	5.6	9.0	4.4	9.7
1998–1999	6.0	9.4	7.0	10.4
1999–2000	7.0	14.1	6.7	22.8
2000–2001	4.2	9.5	7.7	19.0
2001–2002	7.6	14.6	5.9	7.7
2002–2003	5.2	11.3	5.8	11.1
2003–2004	4.7	11.1	8.1	10.5
2004–2005	7.2	13.2	5.6	6.9
2005–2006	6.9	21.7	11.2	13.6
2006–2007	5.5	10.6	5.1	8.2
2007–2008	10.8	12.6	7.5	3.4
2008–2009	6.4	10.8	6.8	12.4

[a] Zero days hunted indicates there were no unsuccessful hunters.

TABLE 7 Delta bison hunts DI403 and DI404 applications received and permits issued, 1977–2008

Year	Applications received	Permits issued
1977	2,121	20
1978	3,555	15
1979	3,970	25
1980	4,561	35
1981	5,237	55
1982	8,105	75
1983	7,889	75
1984	11,276	55
1985	666[a]	55
1986	6,585	65
1987	6,434	50
1988	9,705	50
1989	10,151	65
1990	11,822	90
1991	11,057	100
1992	12,387	100
1993	13,654	120
1994	13,977	40
1995	15,257	120
1996	17,895	120
1997	15,479	130
1998	16,188	100
1999	15,443	100
2000	16,178	100
2001	15,470	130
2002	15,817	135
2003	16,286	130
2004	14,519	75
2005	13,952	65
2006	8,762[b]	80[b]
2007	15,397	130
2008	16,597	170

[a] Eight thousand nine hundred thirty-one applications were received before Tier II regulations were implemented and applications were returned.

[b] Only 65 DI403 bull permits were announced in the permit drawing supplement. After the drawing an additional 15 DI404 cow permits were drawn from the pool of DI403 applicants.

TABLE 8 Delta bison hunter reported residency and success for drawing permit hunts DI403 and DI404, regulatory years 1986–1987 through 2008–2009

Regulatory year	Successful					Unsuccessful					Total hunters
	Local[a] resident	Nonlocal resident	Nonres	Unk	Total (%)	Local[a] resident	Nonlocal resident	Nonres	Unk	Total (%)	
1986–1987	4	57	0	1	62 (100)	0	0	0	0	0 (0)	62
1987–1988	1	44	0	1	46 (100)	0	0	0	0	0 (0)	46
1988–1989	2	40	1	2	45 (94)	0	3	0	0	3 (6)	48
1989–1990	3	57	0	0	60 (98)	0	1	0	0	1 (2)	61
1990–1991	4	31	0	0	35 (92)	0	3	0	0	3 (8)	38
1991–1992	3	86	2	0	91 (91)	2	7	0	0	9 (9)	100
1992–1993	6	87	1	2	96 (99)	0	1	0	0	1 (1)	97
1993–1994	5	103	1	0	109 (92)	0	9	0	0	9 (8)	118
1994–1995	0	38	0	0	38 (97)	0	1	0	0	1 (3)	39
1995–1996	3	103	0	0	106 (91)	0	10	0	0	10 (9)	116
1996–1997	2	97	1	3	103 (90)	0	11	0	1	12 (10)	115
1997–1998	5	101	12	0	118 (94)	0	6	2	0	8 (6)	126
1998–1999	0	72	0	0	72 (74)	0	25	1	0	26 (27)	98
1999–2000	0	67	0	0	67 (69)	2	27	1	0	30 (31)	97
2000–2001	5	67	0	0	72 (80)	0	18	0	0	18 (20)	90
2001–2002	4	93	1	0	98 (76)	1	30	0	0	31 (24)	129
2002–2003	3	102	0	0	105 (80)	0	24	2	0	26 (20)	131
2003–2004	0	76	1	0	77 (63)	0	46	0	0	46 (37)	123
2004–2005	1	46	0	0	47 (69)	0	21	0	0	21 (31)	68
2005–2006	2	42	0	0	44 (76)	0	14	0	0	14 (24)	58
2006–2007	2	57	1	0	60 (78)	0	17	0	0	17 (22)	77
2007–2008	8	90	1	0	99 (70)	2	42	0	0	44 (31)	143
2008–2009	4	108	1	0	113 (71)	3	44	0	0	47 (29)	160

[a] Local residents reside in Unit 20D.

TABLE 9 Delta bison percent harvest[a] by month, regulatory years 1994–1995 through 2008–2009

Regulatory year	Percent harvest by month							
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	*n*
1994–1995[b]	61	11	8	0	5	16	0	38
1995–1996[b]	42	25	8	5	8	14	0	106
1996–1997[b,c]	23	34	3	6	11	13	11	103
1997–1998	46	26	6	0	8	14	0	118
1998–1999	45	16	4	1	13	21	0	71
1999–2000[d]	39	19	2	5	14	14	9	65
2000–2001	55	23	3	1	10	8	0	74
2001–2002	37	24	8	3	10	16	0	98
2002–2003	44	22	5	2	9	19	0	105
2003–2004	31	30	8	4	8	20	0	77
2004–2005	52	15	2	7	13	11	0	46
2005–2006	44	20	4	9	9	13	0	45
2006–2007	47	19	5	5	10	12	2	60
2007–2008	32	17	3	12	13	22	0	99
2008–2009	29	23	3	1	19	26	0	113

[a] Percentages may not total 100% due to rounding.
[b] The hunting season opened on 7 Oct versus 1 Oct.
[c] The hunting season was extended by emergency order to include 1–30 Apr 1997.
[d] The hunting season was extended by emergency order to include 1–15 Apr 2000.

TABLE 10 Delta bison harvest percent[a] by transport method for Hunts DI403 and DI404, regulatory years 1991–1992 through 2008–2009

Regulatory year	Harvest percent by transport method								
	Airplane	Horse/ Dog team	Boat	3- or 4-wheeler	Snowmachine	Other ORV	Highway vehicle	Unknown	*n*
1991–1992	1	0	0	1	14	3	67	14	93
1992–1993	0	0	0	4	49	1	41	5	96
1993–1994	0	2	0	5	24	4	66	0	109
1994–1995	0	0	0	0	39	3	56	0	39
1995–1996	0	0	0	3	16	2	78	0	116
1996–1997	0	0	0	2	13	4	78	3	100
1997–1998	0	0	1	3	33	3	59	2	118
1998–1999	0	0	0	1	19	1	74	4	72
1999–2000	0	0	0	9	33	0	58	0	67
2000–2001	0	0	0	4	11	6	79	0	72
2001–2002	0	0	0	1	13	4	79	2	131
2002–2003	0	0	0	4	0	2	90	4	135
2003–2004	0	0	0	0	22	3	75	0	77
2004–2005	0	0	0	6	18	3	72	0	65
2005–2006	0	0	0	11	6	7	74	2	54
2006–2007	0	0	0	3	12	2	82	2	60
2007–2008	0	0	0	2	7	5	85	1	100
2008–2009	1	0	0	2	21	3	70	3	114

[a] Percentages may not total 100% due to rounding.

TABLE 11 Delta bison harvest percent[a] by kill location during permit hunts DI403 and DI404, regulatory years 1989–1990 through 2008–2009

Regulatory year	Location of kill			
	Delta Agriculture Project	Delta Junction Bison Range	Other	Unknown
1989–1990	95	5	0	0
1990–1991	91	9	0	0
1991–1992	77	23	0	0
1992–1993	78	17	5	0
1993–1994	75	24	1	0
1994–1995	86	14	0	0
1995–1996	68	26	6	0
1996–1997	56	32	12	0
1997–1998	70	21	4	4
1998–1999[b]				0
1999–2000	51	29	19	2
2000–2001	77	13	10	0
2001–2002	65	25	10	0
2002–2003	78	21	1	0
2003–2004	71	21	8	0
2004–2005	76	11	13	0
2005–2006	63	26	12	0
2006–2007	81	14	0	5
2007–2008	72	16	11	1
2008–2009	73	23	4	0

[a] Percentages may not total 100% due to rounding.
[b] Data not available.

The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge and attitudes for responsible hunting.